

1-1-1915

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## Recommended Citation

Pammel, L. H. (1915) "The Flora of Star Island and Vicinity," *Ames Forester*: Vol. 3 , Article 10.  
Available at: <https://lib.dr.iastate.edu/amesforester/vol3/iss1/10>

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# The Flora of Star Island and Vicinity

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It was my privilege during the latter part of July and early August to spend a week with the forestry students of Iowa State College on Star Island to give a few lectures on the flora of the region. I desire to express my appreciation of the kindness shown me by the forestry students while in camp and for some specimens. Nearly all of the students contributed in one way or another plants of some kind. I am under great obligations to Profs. MacDonald and Morbeck as well as to Mr. Marshall, the forest supervisor and to Miss Rasmussen for many additional favors; to Mr. C. R. Ball for the identification of the willows; to Mr. R. I. Cratty for the identification of species of the genus *Carex*, and to Dr. Robinson for the determination of the oaks. In addition to the above collectors most of the plants were collected by P. S. McNutt, my son, Harold, and myself. Professor MacDonald furnished me with the photographs. Mr. Bode and Mr. Geisler made a map of the Island showing the main characteristics of the flora. The list of plants is by no means complete. We made a hasty survey of the region of Star Island, Cedar Island<sup>1</sup> and in the vicinity of Cass Lake. The early vernal plants had all disappeared.

## LITERATURE OF THE REGION

Star Island and its vicinity is connected with some of the early history of Minnesota. One David Thompson came to this region in 1798. Cass Lake was the traders' route from the Red River country to the settled portions of the United States farther east. Zebulon Montgomery Pike found a man by the name of Roy in the Northwest Company house on the east or left bank of Cass Lake, February 12, 1806. Governor Cass and Henry Schoolcraft were at the same point in 1820. Beltrami was here in 1823 and Nicollet, the only geographer of the early day, was here in 1836. Of all the early accounts of the region the one of greatest interest centers in the Pike expedition. We cannot follow Pike the entire journey. Pike tells us he left Lake La Sang Sue, now

<sup>1</sup>These are the two prominent islands in Cass Lake, a number of smaller islands occur in Allen Bay region off from the northwest point of Star Island.

Leech Lake, at 2:30 o'clock for Lake Winiple (Winnibigoshish). He thought Leech Lake was the main source of the Mississippi river. Cass Lake region was considered to be the upper source. The discovery that the water of this lake discharges into the Mississippi river by way of Leech river and is not one of the sources of the Mississippi was made later. The party arrived at the (upper) Red Cedar Lake, now known as Cass Lake at the establishment of the Northwest Company house on Cass Lake,<sup>2</sup> on February 12, 1806. During Pike's expedition French names had been applied to many of points of interest in the region, this lake was known as Haut Lac aux Cedres Rouges or the Upper Cedar Lake to distinguish it from another Cedar Lake further down the Mississippi near Aitkin. These lakes were both so named because of the abundance of red cedar (*Juniperus virginiana*). In the immediate vicinity of Cass Lake the red cedar is abundant only on Cedar Island. It is curious how few names Pike gave to points of interest in the region. Pike's name is commemorated in Pike's Bay which connects with Cass Lake by a short stream. It is strange that not more names commemorating Pike occur in the region. Cass Lake honors the memory of the famous General Lewis Cass, who with Schoolcraft, explored this region some years after Pike did. Schoolcraft called the lake Cassina or Cassinian Lake, later changing it to Cass Lake. Long's map of 1823 uses the name Cass Lake.

Star Island has gone by the name of Colocaspi or Grand. This is a curious name which was given to the island by Schoolcraft<sup>4</sup> from the names of three explorers, Cass, Schoolcraft and Pike.

Brower in 1894 named the island Ozawindib or Yellow Head. This was the name of the Chippeway Indian chief when Schoolcraft visited the place on July 10 and 15. He camped on one of the anvils of the island, according to Coues. The place has been quite famous ever since. The anvil of the island where Chippewa village of Ozawindib lies and where Schoolcraft camped on the northeast point of the island connects with a shoal to the northward. I was on the point. Mr. Cassidy, who rowed around the island, tells me that the bottom of the lake near this point is quite stony.

The island is connected with a shallow bank in the lake to the mainland. The shallow place was, no doubt, raised above the water during the summer. The government dam has raised the water so that now it is generally covered during the year. At any rate this general region has been much used by trading parties and explorers.

<sup>2</sup>The expedition of Zebulon Montgomery Pike to the headwaters of the Mississippi River, through Louisiana Territory and in New Spain during the years 1805-6-7. New edition by Elliott Coues, 3 volumes, New York, Francis Harper, 1895. Volume 1 contains the Mississippi voyage and a memoir by Coues. It is a most interesting volume especially in the details it gives of the region. Both this work and the Lewis and Clark edition by Coues are splendid monographic historical works. Coues went over the entire region and followed closely only as a keen observer can every land-mark of the region.

<sup>3</sup>The Pike map gives the position of Leech Lake and Cass Lake as well as the N. W. Co. House.

<sup>4</sup>Pike was modest in bestowing names. Schoolcraft named places very freely.



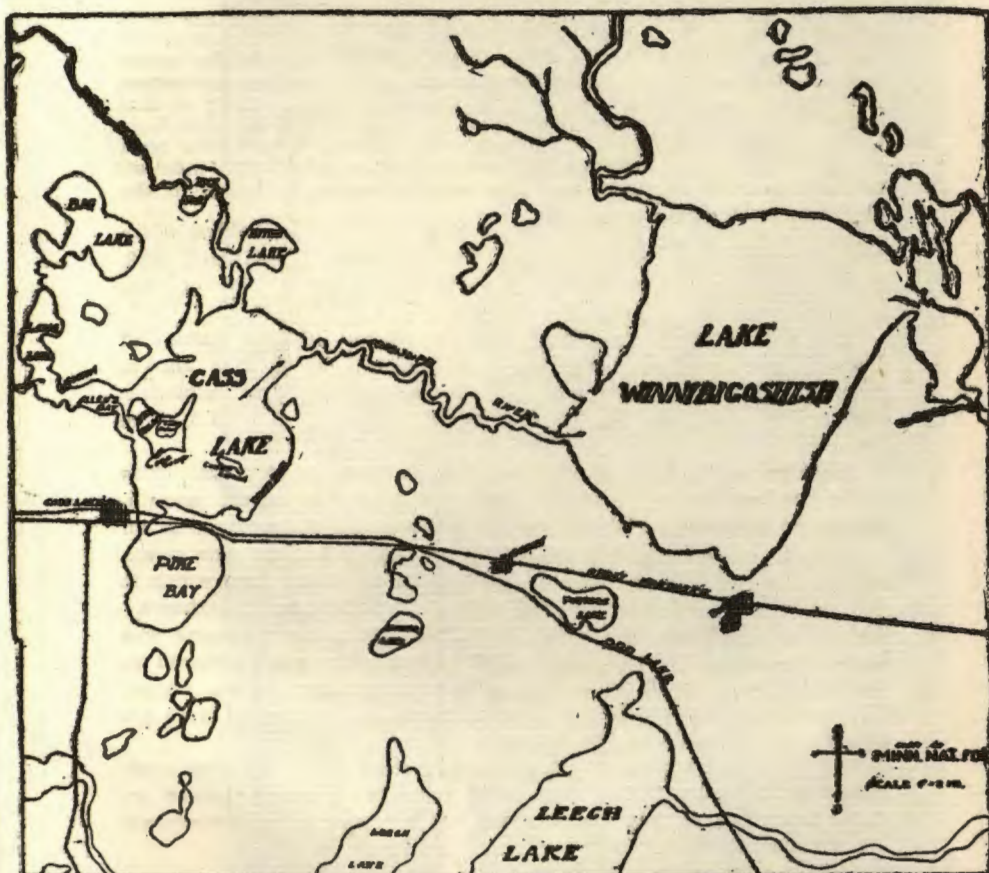


Fig. 1—Map of Cass Lake region. The town of Cass Lake, Star and Cedar Islands, Allen's Bay, Pike's Bay. Redrawn by Mr. Geisler

I. N. Nicollet,<sup>5</sup> sometimes referred to as Professor Nicollet, was the only early real geographer who explored the upper Mississippi and prepared an excellent map of the region. Allen was one of the Schoolcraft party and to him also belongs much credit for the success of the Schoolcraft expedition, especially from the standpoint of the discovery of the source of the Mississippi. Coues<sup>6</sup> says:

James Allen's name is not so well known in this connection as it should be. That is to say, the public seldom connects his name with the discovery of Lake Itasca. But if Mr. Schoolcraft was the actual head of the expedition of 1832, and became its best known historian, Lieutenant Allen was a large and shapely portion of the body of that enterprise, decidedly the better observer, geographer, and cartographer; item, the commander of the military escort, which might have been necessary for safety and success; item, the author of an able, interesting, and important report upon the subject, which he made to the military authorities.

The same authority credits William Morrison as being the first white man to have visited Lake Itasca in 1804 and again in 1811 and 1812. Some doubts have been expressed as to this.<sup>7</sup> Allen's Bay of Cass Lake is named after Lieutenant Allen.<sup>8</sup>

The Schoolcraft party camped on the shores of Cass Lake and spent some time about Leech Lake and Bemidji, or as then known, Pemidiji. The change of names illustrates well how time influences the naming of places. The Nicollet expedition occurred in 1836. The Schoolcraft expedition was made four years earlier.

Speaking of Cass Lake or Lake Cassina, Schoolcraft says: "Its banks are overshadowed by elm, maple and pine along the margin. There are many fields of Indian rice, rushes and reeds, there is an open beach of clean pebbles driven by the waves, but no rock strata appear. It has an island towards the western extremity from which it derives its local name but no red cedar is found around its shores." The name of the lake referred to by Schoolcraft as Lake Cassina was known as Upper Red Cedar Lake in Pike's time. The island pictured on the map by Schoolcraft no doubt is what is now known as Star Island. There are only a few red cedars on this island and while the trees are mature the age could not be determined.

A few red cedar trees on Star Island might easily have been overlooked by Schoolcraft but they could not have been overlooked on Cedar Island where they are abundant. It is probable that Schoolcraft did not visit Cedar Island.

<sup>5</sup>Report intended to illustrate a map of the hydrographical basin of the Upper Mississippi Basin, House of Representatives 28th Congress, 2d session, Document No. 62, Jan. 1, 1845, see p. 61.

<sup>6</sup>L. C. 1: 332.

<sup>7</sup>See Rep. Minn. Geol. Survey 1: 26. See Schoolcraft Narrative Journal of Travels from Detroit Northwest through the Great Chain of American Lakes to the Source of the Mississippi River, etc., 423-16 with maps and figures. Horsford, New York, 1821, 1-419.

<sup>8</sup>There has been much controversy over the source of the Mississippi. Prof. J. E. Todd (The Geol. and Nat. Hist. Survey of Minn., 4: 135) discusses the sources of the Mississippi from the evidence obtained by J. V. Brower (Minn. Hist. Soc. Coll. 7), Levasseur (Minn. Hist. Soc. Coll. 8), Winchell (Minn. Hist. Soc. Coll. 8: 226). Todd says if Lake Itasca be not allowed as the source of the Mississippi then the competition lies between Nicollet and Excelsior Creeks, the former according to Todd having the greater volume and length.





Jack Pine (*Pinus divaricata*) on Star Island. Photographed by Prof. G. B. MacDonald

Beltrami, an Italian after whom the county of that name was named, was a member of Major Long's expedition. He descended Turtle River which flows into Cass Lake. This explorer published a book of travels which deserves more merit than is usually bestowed on it by earlier writers. He seems to have been a self-centered, egotistical man.

The Minnesota Geological survey also published a history of the region.<sup>9</sup>

Mr. Brower<sup>10</sup> expresses some doubt about the English astronomer, David Thompson, being at Itasca Lake in 1812. In 1797 this astronomer made a journey from the north shore of Lake Superior to the mouth of the Assinibola and Pembina Rivers. That William Morrison has some claim as the original discoverer of the source of the Mississippi River was stated in a letter written to his brother, Allan, in 1856.

Thompson's explanations are given in Upham's<sup>11</sup> Minnesota in three centuries.

The Cass and Schoolcraft expeditions of 1820 decided that the real source of the Mississippi was Lac la Biche or Elk Lake named by Schoolcraft as Lake Itasca. The source of the river was discovered by Schoolcraft in 1832. The name had its origin from the pointed expressions furnished by the Rev. Boutwell "Veritas" truth and "Caput" head. Schoolcraft struck out "Ver" and "put" making the two parts of word read Itasca.

### GEOLOGY OF THE REGION

The geology of the region has been discussed by Upham<sup>12</sup> and Todd.<sup>13</sup> The material on the island is drift made up of sand with a light covering of humus. In a few places, notably along the southwestern shore, there are outcrops of a clay. Quite a large number of swamps occur, these are all of recent origin. There are also a number of lakes, the largest, Lake Helen, covers about 200 acres. There is a considerable depression between Lake Helen and the west shore of Cass Lake, and possibly at one time there were two small islands.

Star Island is partly in Cass and partly in Beltrami county, most of it in the latter. The south shore of Lake Helen is on the northern boundary of Cass county. The camp was located in Cass county.

### TOPOGRAPHY AND AREA OF THE ISLAND

Star Island is about two and a quarter miles from the town of Cass Lake in Cass county, Minnesota, and is now embraced in the

<sup>9</sup>The Geology of Minnesota 1: 25-78.

<sup>10</sup>Itasca State Park. An illustrated history. Minn. Hist. Coll. 7: Reprint 1-285. Three maps, numerous plates.

<sup>11</sup>Thompson connection is referred to in Minnesota in three centuries 1655-1908, 1: 296. The Morrison brothers 1 c. 316. Pike's connection with the exploration is given 1 c. 329. Upham gives a short account of the two Schoolcraft Expeditions, 1 c. 349.

<sup>12</sup>The geology of Cass county and of the part of Crow Wing county northwest of the Mississippi River, Geology of Minnesota, 4: 55-81, pl. 58 f. 8.

<sup>13</sup>The Geology of Hubbard county and northwestern portion of Cass county, 1 c. 4: 82-97 pl. 59. The geology of Beltrami county 1 c. 4: 131-155 pl. 84. xv. pl. 1 M. K. f. 11, 12, 13, 14, 15.









Red or Norway Pine (*Pinus resinosa*) on Star Island.  
Photographed by Prof. G. B. MacDonald.

Minnesota national forest reserve. The island gets its name from the points that run out into Cass Lake. The southwest point has rather steep banks. The southeast point has a gentle slope connecting with a shallow part of the lake to Cedar Island. The other points are flat, raised but little above the surface of the lake, more or less marshy. Star Island comprises an area of 1,200 acres, somewhat uneven. The soil is more or less sandy except the low marshes which border the small lakes or Cass Lake beyond the outer beach. Cass Lake is a beautiful lake, the third largest in the drainage area of the Mississippi river exceeded only by Winnibigoshish and Leech, the greatest length is  $9\frac{1}{4}$  miles including Pike's Bay, the greatest breadth is  $7\frac{1}{2}$  miles, including Allen's Bay.

#### BOTANY OF THE REGION

The plants of the region, especially the trees, are referred to by Upham and Todd.<sup>14</sup> Upham mentions the swamp oak (*Quercus platanoidea*). This certainly does not occur in the region, at least in the vicinity of Cass Lake. The other trees check up well. Schoolcraft also mentions some of the trees without botanical names.

The handsomely illustrated Minnesota Trees and Shrubs of F. C. Clements, C. O. Rosendahl and F. K. Butters<sup>15</sup> covers the region. Warren Upham's splendid catalogue of the Flora of Minnesota in a general way covers the region, also MacMillan's Metaspermae of the Minnesota Valley.<sup>16</sup>

#### TREES OF THE ISLAND

The dominant trees are the Norway pine (*Pinus resinosa*) of which many of the virgin trees still remain, the largest one found by the class in forestry was 3 feet in diameter and a height of about 130 feet. There are also many virgin white pines (*Pinus Strobus*). The largest one was about 46 inches in diameter and about 140 feet high. The Jack pine (*Pinus divaricata*) is the third dominant conifer. The paper birch (*Betula papyrifera*), the red maple (*Acer rubrum*) are other common trees. The box elder is not common, occurs with other deciduous trees near the shore line of the lake. Of the other broad-leaved species the burr oak (*Quercus macrocarpa*) and the red oak (*Quercus rubra*) are not uncommon. Possibly also some scarlet oak. This also occurs commonly on the main land. There are a few old cottonwoods (*Populus deltoides*) on the shores of the island. Virgin but not large trees of the hard maple (*Acer saccharum*) occur in numerous places on the Island. The American elm (*Ulmus americana*) is much more common than the slippery elm (*Ulmus fulva*) and the large-toothed aspen (*Populus grandidentata*). The balsam poplar (*Populus balsamifera*) is common. The basswood (*Tilia americana*) is fairly common. The hackberry (*Celtis occidentalis*) and the yellow birch

<sup>14</sup>Geol. and Nat. Hist. Survey, 4:55, 4: 82.

<sup>15</sup>Report of the Botanical Survey, 9: 1-313; numerous figures un-numbered pl. VI Annual Report of Progress 1912. Geo. & Natural History Survey of Minnesota.

<sup>16</sup>Geol. & Natural History of Minn. Botanical Series 1: 1-826.



(*Betula lutea*) are rare. The green ash (*Fraxinus pennsylvanica* var. *lanceolata*) is common on the island. The red ash (*Fraxinus pennsylvanica*) is confined to swamps. There are no tree willows on the island. On the shores of Cass Lake a few specimens of *Salix amygdaloides* were observed, but they are mere shrubs. The white cedar (*Thuja occidentalis*) is very rare; only a few specimens were observed on the shore of Lake Helen. One old specimen of the red cedar was observed on a high point near the shore. This, too, is somewhat peculiar since the red cedar is abundant on Cedar Island. A considerable number of the balsam fir (*Abies balsamea*) occur on the island, sometimes in low marshes, at other times on sandy wooded uplands. On Cedar Island an abundance of the species occurs on a high sandy bank. The black spruce (*Picea mariana*) occurs in swamps with the larch (*Larix laricina*). The white spruce (*Picea canadensis*) is common over the island on the borders of old swamps with deciduous trees and Norway pine. The pin cherry (*Prunus pennsylvanica*) is common where fire has run through the woods. The choke cherry (*Prunus virginiana*) is widely distributed.

TABLE SHOWING THE DISTRIBUTION OF TREES ON THE ISLAND COMPARED WITH OTHER REGIONS

Species	Mo.	Ga.	Wis.	Man.	Iowa	Ill.
<i>Pinus Strobus</i> .....	0*	P†	P	P	P <sup>1</sup>	P <sup>2</sup>
<i>Pinus divaricata</i> .....	0	0	P	P	0	P <sup>2</sup>
<i>Pinus resinosa</i> .....	0	0	P	P	0	P
<i>Larix laricina</i> .....	0	0	P	P	0	P <sup>2</sup>
<i>Picea rubra</i> .....	0	0	P	P	0	0
<i>Picea mariana</i> .....	0	0	P	P	0	0
<i>Abies balsamea</i> .....	0	0	P	P <sup>2</sup>	P <sup>4</sup>	0
<i>Thuja occidentalis</i> .....	0	0	P	P	0	P <sup>2</sup>
<i>Juniperus virginiana</i> .....	P	P	P	P <sup>2</sup>	P	P
<i>Salix amygdaloides</i> .....	P	P	P	P	P	P
<i>Salix lucida</i> .....	0	0	P	P	P	P
<i>Populus tremuloides</i> .....	P	0	P	P	P	P
<i>Populus grandidentata</i> .....	0	0	P	0	P	P
<i>Populus balsamifera</i> .....	0	0	P	P	0	P
<i>Populus deltoides</i> .....	P	P	P	P <sup>2</sup>	P	P
<i>Ostrya virginiana</i> .....	P	0	P	0	P	P
<i>Betula lutea</i> .....	0	0	P	P	P	P
<i>Betula papyrifera</i> .....	0	0	P	P	P	P
<i>Quercus macrocarpa</i> .....	P	P	P	P	P	P
<i>Ulmus fulva</i> .....	P	P	P	0	P	P
<i>Ulmus americana</i> .....	P	P	P	P	P	P
<i>Celtis occidentalis</i> .....	P	P	P	P	P	P
<i>Prunus pennsylvanica</i> .....	0	P <sup>2</sup>	P	P	P	P
<i>Rhus hirta</i> .....	0	P	P	0	P	P
<i>Acer spicatum</i> .....	0	0	P	P	P	P
<i>Acer saccharum</i> .....	0	P	P	0	P	P
<i>Acer rubrum</i> .....	P	P	P	0	0	0
<i>Acer Negundo</i> .....	P	P	P	P	P	P
<i>Tilia americana</i> .....	P	P <sup>2</sup>	P	P	P	P
<i>Fraxinus nigra</i> .....	P	P <sup>2</sup>	P	P	P	P
<i>Fraxinus pennsylvanica</i> .....	P	0	P	0	P	P
<i>Fraxinus</i> var. <i>lanceolata</i> .....	P	P <sup>2</sup>	P	P	P	P

\*The character 0 denotes absence of the species.

†The character P denotes presence of the species.

<sup>1</sup>Central. <sup>2</sup>Northern. <sup>3</sup>In doubt. <sup>4</sup>Northeast. <sup>5</sup>Alberta.

## A FEW ECOLOGICAL NOTES

I shall not attempt to discuss the ecology of the region, though it is of great interest and might well be made the subject of a paper. Star and Cedar Islands, though adjacent, show some marked deviations in their respective floras, thus for instance, the abundance of red cedar on Cedar Island and its scarcity on Star Island is noteworthy. The occurrence of the balsam fir with the red cedar and on steep slopes is of interest. Again the abundance of the Black Ash in the low flat swamp on the margin of the island is another interesting feature of Cedar Island. The shallow water everywhere contains an abundance of the wild rice (*Zizania palustris*) and rush (*Scirpus validus*). This extends, especially between Star and Cedar Islands, long distances into the lake where the water is shallow. The shallow portions of the lakes also contain several species of pond weeds (*Potamogeton*). The white water lily (*Castalia tuberosa*) is common along the shores and bays in shallow water. The little stretches of swampy prairies on the mainland contain the beautiful fringed orchis (*Habenaria psycodes*) and the swamp thistle (*Cirsium muticum*) and the sage willow (*Salix candida*).

In another paragraph the statement was made that the island consists mostly of sandy drift material. Much of this was left here during the glacial period. The topography is quite broken, low areas vary greatly, in some cases swamps and bogs depending on the distance from the water level of the lake; in others the land sufficiently high with good drainage and hence wet only early in the spring. Much of the island is covered with coniferous trees, in other parts mainly deciduous trees and shrubs. On the borders of the swamps an abundance of red maple, alder, etc. The blueberry (*Vaccinium pennsylvanicum*), the bearberry (*Arctostaphylos uva-ursi*), the wintergreen (*Gaultheria procumbens*), *Maianthemum canadense*, *Clintonia borealis*, the yellow flowered vetch (*Lathyrus ochroleucus*), *Spiranthes* and *Habenaria* are found. The club moss (*Lycopodium obscurum* var. *dendroideum*) is common in some places in Norway pine woods. Considerable areas in dry pine woods are covered by another club moss, the *Lycopodium complanatum* var. *flabelliforme*. The *Lycopodium inundatum* occurs in low grounds under the shade of the balsam fir. The common red raspberry (*Rubus idaeus* var. *aculatisissimus*) is common in low grounds, banks and shores or in areas burned by fire where there is plenty of sunshine. The large flowered aster (*Aster macrophyllus*) is the most common aster in woods. Small dogwood (*Cornus canadensis*), the staghorn sumach (*Rhus typhina*) and the beaked hazel (*Corylus rostrata*) as well as the dwarf honeysuckle (*Diervilla trifida*) and honeysuckle (*Lonicera canadensis*) is common in woods with deciduous trees and shrubs.

In a few places where the timber has been burned there is much fireweed (*Epilobium angustifolium*) and the bristly sarsaparilla (*Aralia hispida*).



On Norway Bluff with a small opening-like prairie there is an abundance of the licorice (*Glycyrrhiza lepidota*), the smooth aster (*Aster laevis*) and small blue joint grass (*Andropogon scoparius*) and *Festuca octoflora*. Throughout the timber one finds a great deal of *Salix humilis*.

Swamps and peat bogs are not uncommon on the island. In these there is a zonal distribution of plants. The outer zone is made up of blue joint grass (*Calamagrostis canadensis*) followed by sedges, leather leaf (*Chamaedaphne calyculata*), cranberry (*Kalmia glauca*), *Andromeda Polifolia* and Labrador tea (*Ledum groenlandicum*) with scattered black spruce (*Picea canadensis*), larch (*Larix laricina*) and the myrtle-leaved willow (*Salix pedicellaris*). On the border where drainage is a little better the beaked willow (*Salix rostrata*) occurs and (*Salix petiolaris*), the red osier or dogwood (*Cornus stolonifera*), the speckled alder (*Alnus incana*) and the *Salix discolor*.

The red ash (*Frazinus pennsylvanica*) occurs in swamps with the alder and the red ash. The beaches are fringed with the alder, the red raspberry, dogwood, the sand bar willow and less frequently the shining willow (*Salix lucida*). The balsam poplar (*Populus balsamifera*) is a beach tree although found away from shores especially in swamps. The sandbar willow is not uncommon, the peach-leaved or almond-leaved willow is not common. Deciduous trees like the paper birch and red maple are quite generally distributed over the island with other deciduous trees like the oak and basswood. The hard maple and basswood are associated with the blood-root, Trillium and Arisaema.

#### INTRODUCED PLANTS ON THE ISLAND

The number of introduced plants on Star Island is small indeed. The Canada thistle and bull thistle on the beaches; the red clover, white clover, timothy and alfalfa near the cottages and hotel; lamb's quarters, horseweed, bluegrass and *Anthemis cotula* near the hotel. One might expect to find the horseweeds where the fire destroyed the timber but the most important plant here was the fireweed. It would appear that the virgin forest is a barrier against the spread of Canada thistle and its occurrence on the beaches is due to the transport by water.

#### PLANT FORMATIONS NEAR LAKE HELEN

The following plants occurred in bogs, shore line and in the coniferous forests near the lake. The numbers refer to plats in figure 3:

In water Hydrophytes—Water lily (*Castalia tuberosa*); Rush (*Scirpus validus*); Potamogeton sp.; Smartweed (*Polygonum amphibium*).

Shore Line, from 5-6 feet—Lobelia (*Lobelia Kalmii*); Cowbane (*Cicuta bulbifera*), three species of Carex; Reed grass (*Phragmites communis*); Aster; Greater lobelia (*Lobelia syphilitica*); Meadow grass (*Poa serotina*); Water reed (*Phalaris arundinacea*); Rush (*Scirpus validus*); White Violet (*Viola blanda*); Wild rye (*Elymus canadensis*); Peppermint (*Mentha arvensis*); Solidago sp.

First Rise from Shore—Fire weed (*Epilobium spicatum*); Sedge (*Scirpus lineatus*); Hair grass (*Agrostis hyemalis*); Blue joint (*Calamagrostis canadensis*); Horsetail (*Equisetum sylvaticum*); Alder (*Alnus incana*); Paper Birch (*Betula papyrifera*); Red raspberry (*Rubus strigosus* var.); Spruce (*Picea canadensis*); Choke cherry



A peat bog with Tamarack and Black Spruce forming an island on Star Island. Photographed by Prof. G. B. MacDonald.





A peat bog with Tamarack and Black Spruce forming an island on Star Island. Photographed by Prof. G. B. MacDonald.

(*Prunus virginiana*); Wild rose (*Rosa blanda*); Service berry (*Amelanchier spicata*); Dogwood (*Cornus stolonifera*); Poison ivy (*Rhus toxicodendron*); Pin cherry (*Prunus pennsylvanica*); Red ash (*Fraxinus pennsylvanica*); Green ash (*Fraxinus pennsylvanica* var. *lanceolata*); Quaking aspen (*Populus tremuloides*); Swamp birch (*Betula pumila*); Red oak (*Quercus rubra*); White pine (*Pinus strobus*); Blue berry (*Vaccinium pennsylvanicum*); Beaked hazel (*Corylus rostrata*); Mountain ash (*Pyrus americana*); Bush honeysuckle (*Diervilla lonicera*); Huckleberry (*Gaylussacia baccata*); Bear berry (*Arctostaphylos uva-ursi*); Red maple (*Acer rubrum*); Burr oak (*Quercus macrocarpa*); Swamp fern (*Aspidium Thelypteris*).

Plot I, 9 ft.—50 *Rubus strigosus* var.; 1 *Acer rubrum*; 1 *Quercus rubra*; 16 *Diervilla lonicera*; 1 *Corylus rostrata*; 50 *Vaccinium pennsylvanicum*; 6 *Cornus canadensis*; 3 *Trientalis americana*; 32 *Maianthemum canadense*; 3 *Clintonia borealis*; 1 *Maianthemum canadense*; 2 *Prunus pennsylvanica*; 1 Fire Weed (*Epilobium angustifolium*); 3 *Salix discolor*; 50 *Calamagrostis* (in clump).

Plot II, on ridge, 9 ft.—37 *Alnus*; 1 *Picea canadensis*; 5 *Corylus rostrata*; 7 *Aralia nudicaulis*; 2 *Pinus strobus*; 4 *Pyrus americana*; 22 *Clintonia borealis*; 15 *Gaylussacia*; 5 Rose; 3 *Rubus strigosus* var.

Plot III, 9 ft.—2 *Pinus strobus*; 1 *Acer spicatum*; 60 *Gaylussacia* (estimate); 3 *Betula papyrifera*; 2 *Pyrola rotundifolia*; 6 *Diervilla lonicera*; *Maianthemum canadense* (numerous); *Cornus canadensis* (numerous); *Linnæa borealis* (numerous); 2 *Melampyrum lineare*; 30 *Clintonia borealis*.

Plot IV, 9 ft.—24 *Acer rubrum*; 12 *Aralia nudicaulis*; *Gaylussacia* (numerous); *Linnæa* (numerous); *Eatonia pennsylvanica* (numerous); 2 *Epilobium spicatum*; 1 *Amelanchier spicata*; 1 *Lonicera canadensis*.

Plot V, 36 ft.—5 *Abies balsamea*; 50 *Pinus strobus*; 4 *Acer rubrum*; 52 *Corylus rostrata*; 1 *Betula papyrifera*; 3 *Lonicera canadensis*; 4 *Pinus resinosa*.

Plot VI, 9 ft.—3 clumps *Viola canadensis*; 3 clumps *Pyrola rotundifolia*; 3 *Cornus stolonifera*; 4 *Cornus canadensis*; 6 *Trientalis americana*; 17 *Rubus strigosus*; 10 *Melampyrum lineare*; 5 *Viola canadensis*; *Maianthemum canadense* (numerous); *Linnæa borealis* (numerous); Moss (numerous).

Plot VII, 9 ft.—*Salix discolor*; *Carex* species; 1 *Acer rubrum*; 3 *Rubus strigosus*; 3 *Alnus incana*; 1 *Diervilla lonicera*.

Plot VIII, swamp—*Salix discolor*; *Alnus incana*; *Betula papyrifera*; *Fraxinus pennsylvanica*; var. *lanceolata*; *Aspidium Thelypteris*; Fern.

Plot IX, 9 ft.—5 *Populus tremuloides*; 3 *Amelanchier spicata*; 10 *Corylus rostrata*; 45 *Aster macrophyllus*; 60 *Lycopodium obscurum* var. *dendroideum*; 5 *Acer spicatum*; 5 *Aralia nudicaulis*; 2 *Pteris aquilina*; 1 *Abies balsamea*; 7 *Clintonia borealis*; 10 *Cornus canadensis*; 3 *Diervilla lonicera*; *Linnæa borealis* (numerous); *Smilacina stellata* (numerous).

Plot X, 36 ft.—13 *Picea mariana*; 4 *Populus tremuloides*; 1 *Betula papyrifera*; 5 *Pinus strobus*; 1 *Quercus rubra*; 3 *Acer rubrum*; 4 *Pinus resinosa*; 1 *Abies balsamea*; 50 *Corylus rostrata*; *Arctostaphylos uva-ursi* Bearberry (numerous); *Lycopodium complanatum* var. *fabelliforme* (numerous).

#### PLANTS IN BOG

The plants listed below occurred in one of the smaller bogs, beginning from the center Zone I heath formation, Zone II water arum formation, Zone III blue joint formation (*Calamagrostis*) forming a distinct zone around the marsh. This is the most strongly marked area in the bog.

Zone I, Heath formation—*Chamaedaphne calyculata* (dominant); *Sphagnum* moss; *Ledum groenlandicum*; *Betula pumila*; *Gaylussacia baccata*; *Picea canadensis* (larger specimens dead); *Larix laricina* Tamarack; *Hypnum* moss; Fire weed (occasionally); Birch (occasionally).

Zone II.—*Calla palustris*; *Hypnum* moss.

Zone III.—*Calamagrostis canadensis*; *Potentilla palustris*; *Alnus incana*; *Betula pumila*; *Picea canadensis*.



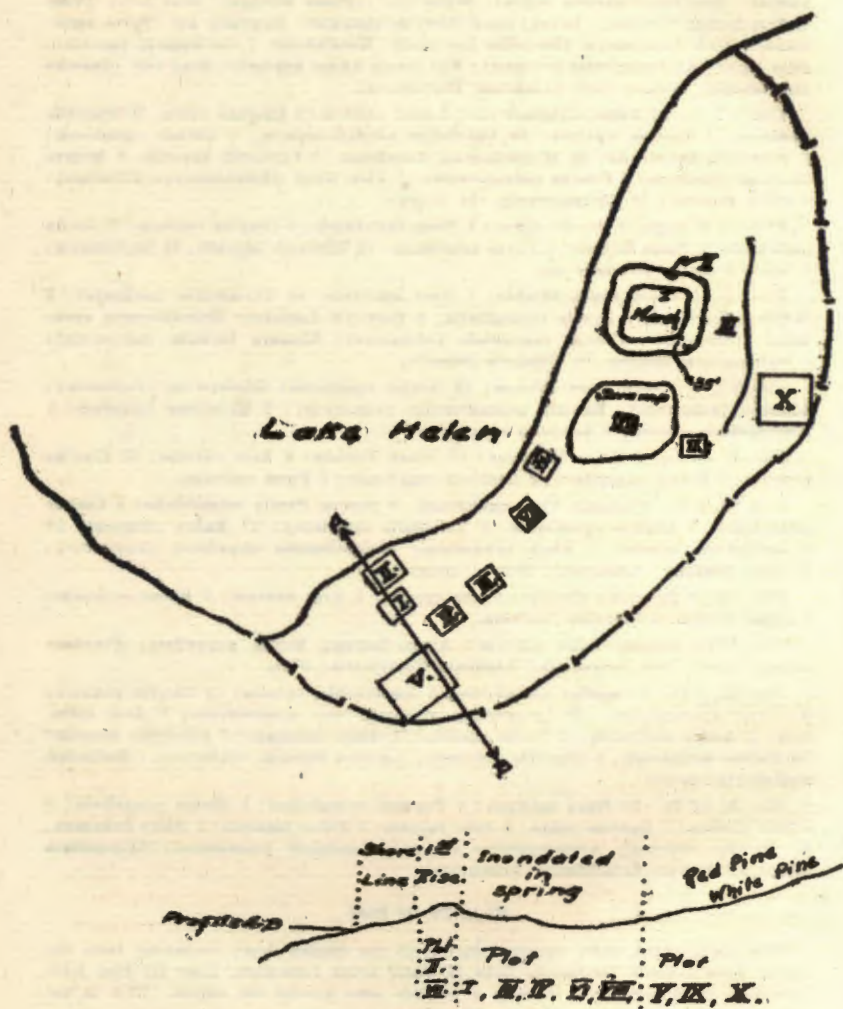


Fig. 2—Ecological map on shore of Lake Helen. See page 128, under plant formations. (Gebler and Bode.)

## PERCENTAGE DISTRIBUTION OF TREES AND SHRUBS ON THE ISLAND

Name of Species	N. W. Point Flat	Norway Pine	White Pine Mixed	Back of Camp Mixed Forest Near Clearing
<i>Pinus resinosa</i> .....		33.82	2.	.4
<i>Pinus Strobus</i> .....		.39		
<i>Pinus divaricata</i> .....		.39		
<i>Amelanchier spicata</i> .....		3.9		3.6
<i>Corylus rostrata</i> .....		16.	23.	47.2
<i>Lonicera glaucescens</i> .....		.39		1.
<i>Lonicera canadensis</i> .....				1.
<i>Rhus typhina</i> .....		2.		10.6
<i>Betula papyrifera</i> .....		5.20	17.5	2.
<i>Cornus stolonifera</i> .....		.39	2.	
<i>Cornus circinata</i> .....			2.	2.2
<i>Salix</i> sp. ....		1.60		.4
<i>Bosa</i> sp. ....		8.58	2.	1.
<i>Picea canadensis</i> .....				1.
<i>Populus tremuloides</i> .....				2.
<i>Rubus strigosus</i> .....				6.
<i>Acer saccharum</i> .....	34.56		2.	2.4
<i>Acer rubrum</i> .....				6.
<i>Acer spicatum</i> .....				1.2
<i>Ostrya virginiana</i> .....	2.88		6.	.6
<i>Tilia americana</i> .....	4.32		2.	3.
<i>Prunus virginiana</i> .....	33.12	1.46	2.	4.2
<i>Prunus pennsylvanica</i> .....		1.20	4.	2.4
<i>Ulmus americana</i> .....	2.88			1.2
<i>Quercus macrocarpa</i> .....	2.88			.2
<i>Quercus rubra</i> .....				.2
<i>Ribes</i> sp. ....	5.76			
<i>Viburnum lentago</i> .....	5.76			
<i>Celastrus scandens</i> .....	2.88			
<i>Symphoricarpos occidentalis</i> .....	1.44	3.9		
<i>Menispermum canadense</i> .....	1.44			

## LOWER FORMS OF PLANTS ON THE ISLAND

The island contains a good many of the lower forms of plants. Of lichens I collected *Cladonia rangiferina* *C. coccifera* and *C. pyxidata* var. *chlorophaea*; of mosses several species of *Hypnum* and *Bryum* occurred, the liverwort (*Marchantia polymorpha*) was common.

Many of the birch trees were attacked by Birch Bracket Fungus (*Polyporus betulinus*) but it was not nearly as common as the *Fomes fomentarius* which occurred everywhere on birch trees from 6 to 8 inches in diameter rapidly destroying the tree. The same species also occurred on the quaking aspen. There also occurred on the maples and birches the *Polyporus hirsutus*. The *Ohlorosplenium aeruginosum* occurred on poplar. This fungus causes the greenish discoloration of wood.

A number of parasitic fungi also were found. Of these mention may be made of the *Puccinia asteris* on *Aster macrophyllus* readily detected because of the definite yellow spots on the upper surface of the leaf and the brown sori on the lower. Black knot (*Plowrightia morbosa*) occurred on the choke cherry and the *Fusicladium pyrinum* on the service berry where it produced witches brooms. The *Aecidium Grossulariae* on the wild gooseberry was not common. The *Calyptrasporea goeppertiana* on *Vaccinium pennsylvanicum* was common; where it was found usually a large number of diseased plants occurred. The



*Exobasidium vaccinii* was common on *Vaccinium pennsylvanicum*, *Gaylussacia baccata* and *Chamaedaphne calyculata*. The *Exoascus alni incanae* was common on the catkin scales of *Alnus incana* easily recognized by the elongated scales. *Peridermium elatinum* producing witches brooms occurred on the balsam fir on Cedar Island. The writer also saw but did not collect a *Peridermium* on *Picea canadensis*, this also produced witches brooms.

The lichens and Hymenomycetes were identified by Mr. Wm. Diehl: *Polyporus gilvus* 655 and *Daedalea unicolor* 671 verified by Mr. L. O. Overholts. The following lichens were collected on Star Island:

*Cladonia rangiferina* (L) Web 744; *C. coccifera* (L) Willd. 645; *C. pyxidata chlorophaea* (Spreng) Fl. 646; *Evernia prunastri* (L) Ach. 647; *Usnea barbata* Fr. 648; *Parmelia caperata* (L) Hoffm. 649, 650; *P. borrei* Turn. 651; *Peltigera canina* (L) Hoffm. 652, 653; *Physcia stellaris* (L) Nyl 654; *Placodium cerinum* (Hoffm.) Hopp. 655; *Buellia parasema* (Ach) Koerb 656; *Hypomyces lactiflorum* Schw. on *Lactarius piperatus* Fr. (?) 657; *Colosporium aeruginosum* (Oeder) Tul. 658.

The following Hymenomycetes were collected on Star Island:

*Corticium cinereum* Pers. 659; *Fomes applanatus* (Pers.) Wallr. 660; *F. fomentarius* (L) Gill 661; *Polyporus betulinus* (Bull.) Fr. 661; *P. fumosus* Pers. 663; *P. gilvus* (Schw.) Fr. 665; *P. hirsutus* Wulf. 664; *P. pergamenus* Fr. 102, 666; *P. versicolor* (L) Fr. 667, 668, 669; *Gloeosporus conoideus* Mont. 670; *Daedalea confragosa* (Bolt.) Fr. 671; *D. unicolor* (Bull.) Fr. 673; *Trametes pini* (Thore) Fr. 674; *Favolus canadensis* Klatzsch. 672.

The following fungi from Star Island, Minnesota, and its vicinity, were identified by O. Schultz:

*Claviceps purpurea* Tul. on *Secale cereale*, 707; *Plowrightia morbosa* Sacc. on *Prunus virginiana*, 797; *Septoria smilacinae* Ell. & Martin on *Smilacina stellata*, 822; *Septoria smilacinae* Ell. & Mar. on *Smilacina racemosa*, 810; *Aecidium Grossulariae* D. C. on *Ribes cynobasti*, 454; *Puccinia asteris* Duby on *Aster macrophyllum*, 823; *Exoascus alni incanae* Kuhn on *Alnus incana*, 646; *Aecidium grossulariae* D. C. on *Ribes cynobasti*, 640; *Entyloma ranunculi* (Bon.) Schrb. on *Thalictrum*, 641 and 642; *Exoascus alni-incanae* Kuhn on *Alnus incana*, 507; *Puccinia circaeae* P. on *Circaea luteoliana*, 587; *Septoria lobeliae* Pk. on *Lobelia syphilitica*, 582; *Cercospora ampelopsidis* Pk. on *Psedera quinquefolia*, 650; *Fusicladium pirinum* (Lib.) Fuck on *Amelanchier spicata*, 668; *Erysiphe communis* (Wallr.) Schl. on *Lathyrus ochroleucus*, 651; *Cercospora subsanguinea* E. & E. on *Smilacina racemosa*, 577; *Cylindrosporium padi* Karst on *Prunus pennsylvanica*, 306; *Ramularia Tulaneii* Sacc. on *Fragaria*; *Piggottia fraxini* B. & C. on *Fraxinus pennsylvanica*; *Erysiphe communis* (Wallr.) Schl. on *Ranunculus*; *Microsphaera alni* (Wal.) Salm. on *Symphoricarpos* Uredo unidentified on *Glycyrrhiza lepidota*; *Calyptospora goeppertina* Kuhn on *Vaccinium*; *Exobasidium Cassandrae* Pk. on *Cassandra calyculata*, 83; *Gloeosporium* sp. on *Quercus*, 857; *Peridermium elatinum* Schm. & Kze. on *Abies balsamea*.

## SYSTEMATIC CATALOGUE OF THE FERNS, CLUB MOSSES AND FLOWERING PLANTS

### POLYPODIACEAE Fern Family

*Pteris aquilina* L. Star Island, 829. Common brake.

*Aspidium Thelypteris* (L.) Sw. Marsh shield fern. Star Island, 503, 597. Common in marshes.

*Aspidium noveboracense* (L.) Sw. Northern shield fern. Cedar Island, 40. In sandy woods.

*Asplenium Filix-femina* (L.) Bernh. Lady fern. Star Island, 512.



Young growth of Jack Pine (*Pinus divaricata*) on Star Island.  
Photographed by Prof. G. B. MacDonald.



## EQUISETACEAE Horsetail Family

*Equisetum arvense* L. Common horsetail. Fairly common. Shore of Cass Lake, 510, 610.

*Equisetum sylvaticum* L. Horsetail. In low grounds, near swamps. Star Island, 328. Cass Lake, 608.

*Equisetum hyemale* L. var. *robustum* (A. Br.) A. A. Eaton. Scouring rush.

## LYCOPODIACEAE Club Moss Family

*Lycopodium inundatum* L. Club moss. Star Island, 813, in low woods, border of swamp.

*Lycopodium obscurum* L. var. *dendroideum* (Michx.) D. C. Eaton. Club moss. Star Island, 498. Under balsam fir trees.

*Lycopodium complanatum* L. var. *flabelliforme* Fernald. Club moss. Star Island, 600, 651, 880. On sandy grounds in pine woods.

## PINACEAE Pine Family

*Pinus Strobus* L. White pine. Star Island on sandy soil. Common.

*Pinus Banksiana* Lamb. Jack pine. Common Norway Beach. Cedar Island, 602, 448. Cass Lake, 604.

*Pinus resinosa* Ait. Star Island, 493. Common. The most important tree on the island.

*Larix laricina* (Du Roi). Koch. Tamarack. Star Island, 428, 659, in peat bog and tamarack swamp.

## NAJADACEAE Pondweed Family

*Potamogeton Richardsonii* (Benn.) Rydb. Pondweed. In deep water. Cass Lake, 636.

*Potamogeton natans* L. Pondweed. Cass Lake, 637, in quiet water.

*Potamogeton lucens* L. Pondweed. In ponds. Star Island, 808.

## ALISMACEAE Water-Plantain Family

*Sagittaria heterophylla*. Pursh. Pondweed. Star Island, 647.

## HYDROCHARITACEAE Frog's Bit Family

*Vallisneria spiralis* L. Bel grass. Cass Lake, 432. Common in shallow water.

## GRAMINEAE Grass Family

*Andropogon scoparius* Michx. Little blue stem. Star Island. Norway Beach.

*Zizania palustris* L. Wild rice. Common in all of the shallow lakes.

*Phalaris arundinacea* L. Reed grass. Swamps, 550. Cedar Island, 47.

*Muhlenbergia racemosa* (Michx.) B. S. P. Cass Lake, 232. Low grounds.

*Muhlenbergia sylvatica* Torr. Dropseed grass. Cedar Island. Sandy swamps, 568.

*Muhlenbergia tenuiflora* (Willd.) B. S. P. Cedar Island, 48. Star Island, 12. In swamps.

*Phleum pratense* L. Timothy. Naturalized on the island. Star Island, 675.

*Calamagrostis canadensis* (Michx.) Beauv. Star Island, 824. Common.

*Brachyelytrum erectum* (Schreb) Beauv. Cedar Island, 41. In woods, also observed on Star Island.

*Agrostis alba* L. Red top. Cass Lake, 295.

*Agrostis hyemalis* (Walt.) B. S. P. Hair grass. Sandy beaches. Star Island, 74.

*Sphenopholis pallens* (Spring.) Scrib. Cedar Island, 46. In swamps.

*Poa triflora* Gilib. Fowl meadow grass. Star Island, 17, swamps.

*Poa pratensis* L. Blue grass. June grass. Cass Lake, 289.

*Glyceria grandis*. Wats. Reed meadow grass. Star Island, 200. In moist places.

*Festuca occidentalis* Hook. Fescue grass. Star Island, 441. Norway Bluff. Sandy soil. Not common on island.

*Bromus ciliatus* L. Hairy chess. Common in moist woods, 18, 520.

*Bromus Kalmii* Gray. Swamp chess. Shore of lake near I. S. C. camp. Common, 588, 599.

*Agropyron Smithii* Rydb. Western wheat grass. Star Island, 843. Not common.

*Agropyron tenerum* Vasey. Slender wheat grass. Open places, shore of Cass Lake. Star Island, 648.

*Agropyron caninum* (L.) Beauv. Awned wheat grass. Sandy beaches. Cass Lake, 290, 664.

*Elymus striatus*. Willd. Wild rye. Star Island, 790. In woods.

*Elymus canadensis* L. Wild rye. Star Island, 798. Shore of Cass Lake.

#### CYPERACEAE Sedge Family

*Cyperus Schweinitzii* Torr. Galingale. Common in sandy soil, forming hard, clustered corms. Norway Beach, 282.

*Scirpus lineatus* Michx. Wool grass. Star Island, 66. Low grounds, swamps.

*Scirpus validus* Vahl. Star Island.

*Carex Crawfordii*. Fernald. Sedge. Star Island in low grounds, 524.

*Carex trichocarpa* Muhl. Sedge. Star Island, 624, in swamps. Copious brown "roots" and rootstocks.

*Carex trichocarpa* Muhl. var. *aristata* (R. Br.) Bailey. Sedge. Star Island, 90, 499, 528.

*Carex filiformis* L. In bogs around Cass Lake.

#### ARACEAE Aroid Family

*Arisaema triphyllum* (L.) Schott. Star Island, 439. In broad leaved woods.

*Calla palustris* L. Water arum. In bogs with spagnum moss. Star Island, 80, 590.

#### JUNCACEAE Rush Family

*Juncus filiformis* L. Rush. Cass Lake, 85-758. Swamps.

*Juncus marginatus* Rostk. Rush. Swamp. Star Island, 86.

#### LILIACEAE Lily Family

*Uvularia grandiflora* Sm. Bellwort. Star Island, 58, 789. In sandy woods.

*Lilium philadelphicum* L. Wood lily. Cass Lake, 292. Meadows.

*Clintonia borealis* (Ait.) Raf. Star Island. Common in pine woods.

*Smilacina racemosa* (L.) Desf. False spikenard. Cass Lake. Star Island, 576. Norway Beach, 809.

*Smilacina stellata* (L.) Desf. False Solomon's seal. Cedar Island, 575. Cass Lake,

*Polygonatum biflorum* (Walt.) Ell. Solomon's seal. Cedar Island, 575. Cass Lake, 535

*Maianthemum canadense* Desf. Sandy woods. Star Island, 368, 750, 858.

*Smilax herbacea* L. Carrion-flower. Star Island, 587.

*Smilax octorhiza* (Englm.) Wats. Smilax. Cass Lake, 677, 807. In woods.

#### ORCHIDACEAE Orchid Family

*Cypripedium acaule* Ait. Stemless lady slipper. Star Island, 314. Common in pine woods.

*Cypripedium hirsutum* Mill. Showy lady slipper. Cass Lake. Bode & McNutt. In low grounds on the shore. The writer did not see this, but reported to me several times.

*Habenaria bracteata* (Willd.) R. Br. Star Island. No specimens in collection. This was observed.

*Habenaria orbiculata* (Pursh.) Torr. In pine woods. Cass Lake, 621.

*Habenaria psycodes* (L.) Sw. Purple Fringed orchid. Meadows, Cass Lake.

*Spiranthes cernua* (L.) Rich. Ladies' tresses. Sandy woods. Star Island, 371.

*Epipactis repens* (L.) Crantz var. *ophioides* (Fernald) A. A. Eaton. Pine woods, low grounds. Star Island, 315.

#### SALICACEAE Willow Family

*Salix amygdaloides* Anders. Peach-leaved willow. Found only on the shores of Cass Lake. Star Island, 629. Cass Lake, 566. The few specimens observed are small.

*Salix lucida* Muhl. Shining willow. On the beaches of Cass Lake around Cedar and Star Islands. Not common. Star Island, 30, 635. Cedar Island, 320, 541.

*Salix fluviatilis* Nutt. Sandbar willow. This is the *S. longifolia* Muhl. (Robinson and Fernald Gray's Man. of Bot. 7 ed. 323 f. 649.) Common on the shores of Cass Lake. Star Island, 656.

*Salix fluviatilis* Nutt. var. *linearifolia* Ryb. Not common. A very narrow leaved form. Star Island, 437.

*Salix cordata* Muhl. Pussy willow. In low grounds on the islands and mainlands. Cedar Island, 50, 543, 574. Star Island, 791.





Photographed by Prof. G. B. MacDonald.  
Balm of Gilead (*Populus balsamifera*) on Star Island.

- Salix pedicellaris* Pursh. var. *hypoglauca*. Common. Identified by C. R. Ball. Cedar Island, 583, 584. Star Island, 854.
- Salix discolor* Muhl. Glaucous willow. Common. Star Island, 200, 514, 584, 820. Cedar Island, 586. Cass Lake, 481. No. 12 of Star Island is doubtfully determined by C. R. Ball as *S. discolor* or *S. prinoides*.
- Salix prinoides* Pl. Pussy willow. Star Island, 526. *S. discolor* (Robinson and Fernald Gray's Man. 7 ed. p. 325.)
- Salix petiolaris* Sm. Pussy willow. Cedar Island. This may be the *S. pellita* Anders. Specimens not sufficient for determination. Star Island, 14, 502, 589, 594. Cass Lake, 98.
- Salix humilis* Marsh. Prairie willow. Common in cut over woods and burns. Star Island, 18, 598, 655, 784, 820, 826, 851. Cass Lake, 255.
- Salix bebbiana* Sarg. Beaked willow. Common in moist place. Star Island, 91, 513. Cedar Island, 332. Cass Lake, 28. This is the *S. rostrata* Richards. (Robinson and Fernald Gray's Man. 7 ed. p. 326.)
- Salix candida* Flugge. Hoary willow. Cass Lake, 30. In a bog near boat landing. I expected to find this willow common in the bogs. The only place where it was common was in a bog near the boat landing growing with *Cornus stolonifera* and *Carex* sp.
- Populus tremuloides* L. Quaking aspen. Star Island. Common.
- Populus grandidentata* Michx. Large toothed aspen. Star Island, 837. Common in places.
- Populus balsamifera* L. Balsam poplar. Star Island, 31, 504, 783. Common.
- Populus deltoides* Marsh. Cotton-wood. Star Island. A few trees.

## BETULACEAE Birch Family

- Corylus americana* Walt. Hazelnut. Cass Lake, Norway Beach, 298. Common on mainland. Does not occur on island.
- Corylus rostrata* Ait. Beaked hazelnut. Star Island, 836. The common hazelnut on the island.
- Ostrya virginiana* (Mill.) K. Koch. Ironwood. Common in broad leaved woods. Star Island, 847, 848. The *Carpinus* was not observed on the island or shores. Common near Minneapolis.
- Betula lutea* Michx. f. Yellow birch. Not common on island. Mr. Truax first observed a few young trees on the island between the hotel and the east beach near the trail. Star Island, 381, 62. More abundant on the mainland. It is common northeastward in Minnesota and Wisconsin.
- Betula papyrifera* Marsh. Paper birch. Common everywhere on the island and mainland. Star Island, 677. Norway beach, 677.
- Betula pumila* L. Swamp birch. Common in bogs. Star Island, 521, 606, 870.
- Alnus incana* (L.) Moench. Speckled alder. Common shores of Lake Helen, Norway Beach, 604, and shores of Cass Lake; Lake Helen, 667; Cedar Island, 585. The catkins are frequently attacked by a fungus *Exoascus*.

## FAGACEAE Oak or Beach Family

- Quercus macrocarpa* Michx. Bur oak. Star Island, 848. Common.
- Quercus rubra* L. Red oak. Cass Lake, 364. The cups are comparatively shallow, the leaves are more deeply cut. Star Island, 365, 838. Leaves deeply cut but without acorns. A small tree appears to be *Q. rubra* L. as well as No. 60, 61, also on Star Island, with small acorns and a rather shallow cup and smooth scales but more deeply lobed leaves appeared to belong here. Star Island, 857, 209, 308. In Robinson and Fernald-Gray's Manual (7th ed.) the *Q. borealis* is given as a synonym of *Q. coccinea* var. *ambigua* Gray. On the sandy cut over lands near Cass Lake this species is often a low scrubby tree. There is also much variation in the cups and lobing of the leaves on the oaks found near Norway Beach on the mainland. Cass Lake, 195, 196.
- Quercus coccinea* Moench. Scarlet oak. This oak is also quite variable occurring on sandy cut over lands, often scrubby, small trees bearing acorns. Cass Lake, 25, 197, 209, 308. Norway Beach, Cass Lake, 801, 803.



## URTICACEAE Elm Family

- Ulmus fulva* Michx. Slippery elm. Star Island, 804. Not common on the island.  
It occurs on two of the points near I. S. C. camp.  
*Ulmus americana* L. American elm. Star Island, 846. Common. Cedar Island, 33.  
*Celtis occidentalis* L. Hackberry. Star Island, 571.  
*Laportea canadensis* (L.) Gaud. Cedar Island, 582. Common in low woods with the American elm.

## SANTALACEAE Sandalwood Family

- Comandra umbellata* (L.) Nutt. Cass Lake, 302. Sandy woods. Common. Cedar Island, 49.

## POLYGONACEAE Smartweed Family

- Polygonum ramosissimum* Michx. Knotwood. Norway Beach, Cass Lake, 234.  
*Polygonum Convolvulus* L. Black bindweed. Wild buckwheat. Cass Lake, naturalized Gt. N. R. R., 564.  
*Polygonum ciliode* Michx. Climbing buckwheat. Star Island, 785. Swamp in woods.  
*Polygonum Persicaria* L. Lady's thumb. Cass Lake, Norway Beach, 284. Naturalized.  
*Polygonum amphibium* L. Water smartweed. Star Island, 638. Common floating in water. Cedar Island, 585.

## CHENOPODIACEAE Goosefoot Family

- Chenopodium hybridum* L. Star Island, 792. Not common.  
*Chenopodium album* L. Star Island, 745. Near cottages. I. S. C. camp.

## NYCTAGINACEAE Four-O'Clock Family

- Salsola Kali* L. var. *tenuifolia*. G. F. W. Mey. Cass Lake. Common.  
*Oxybaphus nyctagineus* (Michx.) Sweet. Star Island, 457, 742. Not common.

## CERATOPHYLLACEAE Hornwort Family

- Ceratophyllum demersum* L. Hornwort. In water, Cass Lake, Star Island, 639.

## NYMPHAEACEAE Water Lily Family

- Nymphaea advena* Ait. Cow lily. Star Island, 442, 458, 652. In ponds.  
*Castalia tuberosa* (Paine) Greene. Water lily. Head of Cass Lake, 417.

## RANUNCULACEAE Crowfoot Family

- Anemone canadensis* L. White wind flower. Cedar Island, 545. In swamps.  
*Anemone virginiana* L. Thimble weed. Sandy woods. Star Island, 874, 745.  
*Anemone quinquefolia* L. Wood anemone. In woods with the hard maple. Star Island.  
*Ranunculus pennsylvanicus* L. f. Bristly crowfoot. Cedar Island, low, sandy, moist shores, 572.  
*Thalictrum dioicum* L. Meadow rue. Cass Lake 623, 632. Star Island.  
*Thalictrum revolutum* D. C. Meadow rue. Star Island.  
*Actaea alba* (L.) Mill. Cedar Island, 38.

## MENISPERMACEAE Moonseed Family

- Menispermum canadense* L. Star Island, 627. The broad leaved climbing plant in woods with elm and basswood.

## BERBERIDACEAE Barberry Family

- Caalophyllum thalictroides* Michx. Blue cohosh. Cedar Island, 321, 630. Not common. Star Island, 311, 744.

## PAPAVERACEAE Poppy Family

- Sanguinaria canadensis* L. Bloodroot. Star Island. Not common. Cass Lake, 629.

## FUNMARIACEAE Fumitory Family

- Corydalis sempervirens* (L.) Pers. Star Island, 793. Sandy woods. Cedar Island, 568.

## CRUCIFERAE Mustard Family

- Erysimum cheiranthoides* L. Worm-seed mustard. Cedar Island, 578, in pine woods.  
*Arabis brachycarpa* (T. & G.) Britton. Rock cress. Star Island, 802. Sandy woods.  
The *A. lyrata* probably also occurs but not observed.  
*Sisymbrium altissimum* L. Tumbling mustard. Cass Lake, 679. Introduced.



Red Elm (*Ulmus fulva*). Photographed by Prof. G. B. MacDonald.



## CAPPARIDACEAE Caper Family

*Polanisia graveolens* Raf. Stinkweed. Star Island, 628, 799. Shore of Cass Lake.

## SAXIFRAGACEAE Currant Family

*Heuchera villosa* Mich. Alum root. Cass Lake, Norway Beach, 287. Along roadside.

*Ribes cynosbati* L. Prickly gooseberry. Sandy woods and swamps. Cedar Island, 326, 631.

*Ribes oxycanthoides* L. Smooth gooseberry. Star Island, 380. Cedar Island, 579.

*Ribes floridum* L. Her. Wild black currant. Star Island, 59. Cedar Island. Low grounds and damp woods.

## ROSACEAE Rose Family

*Spiraea salicifolia* L. Meadow-sweet. Cass Lake, 27. Star Island, 21. In low grounds, common.

*Geum canadense* Jacq. Avens. Cass Lake, 555.

*Amelanchier spicata* (Lam.) C. Koch. Service berry. Common in woods. Norway Beach. Cass Lake, 239. Cedar Island, 635. Star Island, 834.

*Pyrus americana* (Marsh.) D. C. Mountain ash. Star Island, 805. Bank Lake Helen, not common.

*Rubus idaeus* L. var. *aculeatissimus* (C. A. Mey.) Regel & Tiling. *Rubus strigosus* Michx. Red raspberry. This is abundant everywhere on the island except in bogs. Large quantities of berries are picked. Star Island, 381.

*Rubus villosus* Ait. Dewberry. Common in woods and often trailing on the ground. Norway Beach, 288.

*Potentilla monopetala* L. var. *norvegica* (1) Rydb. Cass Lake, 622.

*Potentilla palustris* (L.) Scop. Marsh. Five finger. Star Island.

*Potentilla tridentata* Ait. Three-toothed five finger. Cass Lake. Norway Beach, 232. Sandy open places.

*Rosa blanda* Ait. Wild rose. Star Island, 550. Common.

*Rosa Woodsii* Lindl.? Rose. Cedar Island, swamps. Star Island, 759, 855. This may be *R. blanda*.

*Prunus pennsylvanica* L. f. Pin cherry. Star Island, 29. Cass Lake, 29, 304, 307, 601, 741. Abundant burnt over areas.

*Prunus pumila* L. Sand cherry. Cass Lake, 525, 604. Common sandy soil.

*Prunus virginiana* L. Choke cherry. Star Island, 853. Common. Cass Lake, 199.

## LEGUMINOSAE Pulse Family

*Trifolium pratense* L. Red clover. Star Island, 376. Sparingly naturalized near cottages.

*Trifolium repens* L. White clover. Star Island, 375. Near cottages, not common, introduced. Cass Lake, 587.

*Desmodium canadense* (L.) D. C. Tick trefoil. Head of Cass Lake, 670.

*Medicago sativa* L. Alfalfa. Star Island, 73. Naturalized near I. S. C. camp. Cottages.

*Vicia americana* Muhl. Vetch. In woods. Norway Beach, 237.

*Glycyrrhiza lepidota* (Nutt.) Pursh. Wild liquorice. Star Island. Norway Bluff, 448. Open sandy bank. This is a typical prairie plant.

*Apios tuberosa* Moench. Groundnut. Low grounds. Common. Cass Lake, 551.

*Lathyrus palustris* L. Vetchling. In low grounds, meadows. Star Island, 450, 657.

*Lathyrus ochroleucus* Hook. Yellow flowered vetchling. The most common species.

## ANACARDIACEAE Poison Ivy Family

*Rhus typhina* L. Staghorn sumach. Star Island, 421. Common.

*Rhus glabra* L. Smooth sumach. Cass Lake, Norway Beach, 296. Common on mainland, forming thickets.

*Rhus Toxicodendron* L. Poison ivy. Star Island 11. Common everywhere.

## CELASTRACEAE Bitter Sweet Family

*Celastrus scandens*. Star Island, 522.

## ACERACEAE Maple Family

- Acer spicatum* Lam. Mountain maple. Common everywhere on the island, 787, 63.  
*Acer saccharum* Marsh. Hard Maple. Star Island, 849. Common.  
*Acer rubrum* L. Red maple. Common on the island. In swamps or borders of swamps. Star Island, 64, 845.  
*Acer Negundo* L. Box elder. Star Island. Cultivated, Cass Lake.

## BALSAMINACEAE Jewel Weed Family

- Impatiens biflora*. Walt. Jewel weed. Cedar Island, 84. Common.

## RHAMNACEAE Buckthorn Family

- Ceanothus americanus* L. New Jersey tea. On the mainland. Sandy soil.  
*Ceanothus ovatus* Desf. Red root. Star Island. Cedar Island, 651. Common in open sandy woods following fire. Cass Lake, 557.

## VITACEAE Grape Family

- Paeclera vitacea* (Knerr) Greene. Cedar Island, 649. Not uncommon. Star Island, 519.  
*Vitis vulpina* L. Wild grape. Fox grape. Star Island. The wild grape is somewhat rare on the Island.

## TILIACEAE Basswood Family

- Tilia americana* L. Basswood. Star Island, 850. Common.

## CISTACEAE Pinweed Family

- Lechea stricta* Lergett. Pinweed. Cass Lake, 198. Open places. Sandy soil.

## VIOLACEAE Violet Family

- Viola blanda* Willd. White violet. Bank of Lake Helen. Star Island, 511.  
*Viola conspersa*. Reichenb. Swamp violet. Common in swamps. Cedar Island, 327, 660.  
*Viola canadensis* L. Canada violet. Star Island, 56, 438. In woods. Cedar Island, 569.

## ONAGRACEAE Evening Primrose Family

- Oenothera biennis* L. Common evening primrose. Not common on shore of Cass Lake. Near I. S. C. camp, 746.  
*Epilobium angustifolium* L. Fireweed. Star Island, 54, 518. Common in burnt over areas.  
*Epilobium coloratum* Muhl. Star Island.  
*Circaea lutetiana* L. Cedar Island, 36. Star Island, 516. The *C. alpina* was not observed. It doubtless occurs. Common about Duluth, Lake Superior.

## ARALIACEAE Ginseng Family

- Aralia racemosa* L. Spikenard. Sarsaparilla. Star Island, 749. Broad leaved, rich woods.  
*Aralia hispida* Vent. Bristly sarsaparilla. Star Island, 595. In burnt over areas. Common. Cass Lake, 645.  
*Aralia nudicaulis* L. Wild Sarsaparilla. Star Island.

## UMBELLIFERAE Carrot Family

- Sanicula marilandica* L. Black snakeroot. Star Island, 447. In broad leaved woods.  
*Osmorhiza Claytoni* (Michx.) Clarke. Sweet Cicely. Star Island, 625. Cedar Island, 51, 542. Common.  
*Cicuta bulbifera* L. Swamp Cowbane. In swamps, 71, 509.  
*Slum cicutaefolium* Schrank. Water parsnip. Star Island, 477, in swamp. Not common.

## CORNACEAE Dogwood Family

- Cornus canadensis* L. Dwarf cornel or dogwood. Star Island, 883. Common in pine woods. The large white bracts (flowers) and bright red fruit makes it easily recognised.  
*Cornus stolonifera* Michx. Red-osier. Kinnikinnik. Star Island, 92. Low grounds. Cass Lake, 26. Swamps. Common. Cedar Island, 43. Swamps.  
*Cornus alternifolia* L. f. Dogwood. Star Island, 801. Common.





Vegetation in Norway Pine woods—Club Moss (*Lycopodium*) and False Solomon Seal on Star Island.

## ERICACEAE Heath Family

- Cornus circinata* L. Her. Dogwood. Common. Star Island.  
*Chimaphila umbellata* (L.) Nutt. Pine woods, common. Star Island, 876.  
*Pyrola secunda* L. Star Island, 319, 835.  
*Pyrola elliptica* Nutt. Shin leaf. Star Island, 319. In pine woods.  
*Pyrola americana* Sweet. Shin leaf. Star Island, 319. In pine woods.  
*Pyrola americana* Sweet. Shin leaf. Star Island, 316, 377, 834, 830. In pine woods. Common.  
*Monotropa uniflora* L. Indian pipe. Corpse plant. Star Island, 753. In pine woods.  
*Ledum groenlandicum* Oeder. Labrador tea. Common in all of the larger sphagnum bogs, especially on the margins. Star Island, 701, 866, 828.  
*Gaultheria procumbens* L. Wintergreen. Star Island, 68, 584, 832. Abundant.  
*Arctostaphylos uva-ursi* (L.) Spreng. Star Island, 816. Common.  
*Kalmia polifolia* Wang. Pale laurel. Bog Rosemary. Star Island, 840, 426. Bogs.  
*Andromeda glaucophylla* Link. Star Island, 593. In cold sphagnum bogs.  
*Chamaedaphne calyculata* (L.) Moench. Star Island, 10, 841, 425. Common in sphagnum swamps.  
*Gaylussacia baccata* (Wang.) Koch. Star Island, 60, 69, 501, 827. Swamps.  
*Vaccinium pennsylvanicum* Lam. Blueberry. Star Island, 810. Abundant in pine woods.  
*Vaccinium Oxyccocus* L. Small cranberry. Star Island, 81, 423. Sphagnum bogs.

## PRIMULACEAE Primrose Family

- Trientalis americana* (Pers.) Pursh. Star flower. Star Island, 369, 370. Sandy woods. Common. Cedar Island, 540.  
*Steironema ciliatum* (L.) Raf. Cass Lake, 554. In swamps.

## OLEACEAE Ash Family

- Fraxinus pennsylvanica* Marsh. Red ash. Star Island, 70, 527, 544, 803, in bogs and swamps.  
*Fraxinus pennsylvanicus* Marsh var. *lancoolata* (Borkh.) Sargent. Green ash. Star Island, 15, 84, 96, 806, 792, 814. On the shores of Cass Lake also in sandy woods, swamps, the most common ash, small trees. Cass Lake, 565. Cultivated. Cass Lake.  
*Fraxinus nigra* Marsh. Black ash. Cedar Island, 16. Star Island, 82. Swamps. Common.

## APOCYNACEAE Dogbane Family

- Apocynum cannabinum* L. Indian Hemp. Star Island, 795. Sandy beaches. Cedar Island, 580.

## BORAGINACEAE Borage Family

- Lappula virginiana* (L.) Greene. Beggar's lice. Star Island, 626. In broad leaved woods. Not common.

## VERBENACEAE Vervain Family

- Verbena hastata* L. Blue vervain. Swampy ground near boat landing. Cass Lake, 669.

## LABIATAE Mint Family

- Agastache foeniculum* (Pursh.) Ktze. Common in woods and on banks. Shore of the lake. Star Island, 24, 548, 592, 48, 740.  
*Physostegia virginiana* (L.) Benth. False dragon head. Swamps, shore of Cass Lake. Cass Lake, 459, 555.  
*Stachys palustris* L. Woundwort. Cass Lake swamps, 25, 620, 796.  
*Monarda fistulosa* L. Wild bergamot. Sandy open woods, Norway Beach on the mainland, 280.  
*Mentha arvensis* L. Star Island, 88. Low grounds.  
*Scutellaria galericulata* L. Star Island, 580. Swamps.

## SOLANACEAE Potato Family

- Physalis grandiflora* Hook. Large flowered ground cherry. Cass Lake, 529. Sandy beaches. A showy and handsome plant.



## PHRYMACEAE Lopseed Family

*Phryma leptostachya* L. Lopseed. Star Island, 812. In woods, Cedar Island, 538.

## SCHROPHULARIACEAE Figwort Family

*Castilleja coccinea* L. Painted cup. Cass Lake, 818. In swamps.

*Melampyrum lineare* L. Cow wheat. Abundant, pine woods. Sandy soil. Star Island, 661, 890.

## RUBIACEAE Madder Family

*Galium boreale* L. Northern bed straw. Star Island, 20. Common.

*Galium triflorum* Michx. Sweet scented bed straw. Cedar Island, 89, 529. In woods.

## CAPRIFOLIACEAE Honeysuckle Family

*Diervilla lonicera* Mill. Bush honeysuckle. Star Island. Observed but no specimen collected.

*Lonicera glaucescens* Rydb. Honeysuckle. In woods, sandy soil. Star Island, 367, 508, 605.

*Lonicera canadensis* Marsh. American fly honeysuckle. Star Island, 9, 506. Common in woods.

*Lonicera hirsuta* Eat. Hairy honeysuckle. Star Island, 9. In woods.

*Linnaca borealis* L. var. *americana* (Forbes) Rehder. Star Island, 611, 818. Common in pine woods.

*Viburnum lentago* L. Wild raisin. Star Island 58, 798. Common in low thickets. Cedar Island, 536, 678.

*Viburnum opulus* L. var. *americanum* (Mill.) Ait. Cass Lake. Norway Beach, 612. Cedar Island, 560.

*Sambucus canadensis* L. Common elder.

*Sambucus racemosa* L. Red elder. Star Island, 517, 747. Common on Island.

## CAMPANULACEAE Bellflower Family

*Campanula sparinoides* Pursh. Star Island, 819. Common in swamps.

*Campanula rotundifolia* L. Harebell bluebell. Star Island, 825. Sandy open places.

## LOBELIACEAE Lobelia Family

*Lobelia siphilitica* L. Great lobelia. Star Island, 80, 531. In low grounds, swamps.

*Lobelia Kalmii* L. Bog lobelia. Star Island, 79. Peat bog. Common.

## COMPOSITAE Aster Family

*Eupatorium purpureum*. Joe-Pye weed, or purple boneset. In swamps. Shore of Cass Lake. Common, 553, 754, 581.

*Eupatorium perfoliatum* L. White flowered boneset. Star Island, 68, 549. Swamps. Common.

*Liatris cylindracea* Michx. Blazing star. Norway Bluff, 412. Not common.

*Solidago latifolia* L. Goldenrod. Star Island in woods, 800.

*Solidago nemoralis* Ait.. Cass Lake. Norway Beach, 291, 430. Roadsides.

*Solidago canadensis* L. Goldenrod. Cedar Island, 44, 634, with small heads and coarsely serrate, smoothish leaves. Star Island, 77.

*Solidago serotina* Ait. Star Island, 666, in swamps.

*Solidago missouriensis* Nutt. In open meadows. Cass Lake, 81, 617, 662.

*Solidago graminifolia* (L.) Salisb. Goldenrod. Star Island, 67. Low grounds.

*Solidago speciosa* Nutt. Goldenrod. Cass Lake, 619.

*Aster macrophyllus* L. Star Island, 445. Common in pine woods.

*Aster sagittifolius* Wedemyer. Aster. Cedar Island, 539. In woods. Star Island, 77. Cass Lake. Norway Beach, 293.

*Aster laevis* L. Smooth aster. Star Island, 659, 281. In open places. Norway Beach, 285, 283, 288.

*Aster junceus*. Ait. Bog aster. Bogs. Star Island, 72. Common.

*Aster paniculatus* Lam. Swamp aster. Star Island, 76. In low grounds. Cass Lake, 201.

*Erigeron ramosus* (Walt.) B. S. P. Cass Lake, 286. Common.

*Erigeron canadensis* L. Star Island, 495. Rare. Shore of lake.

*Antennaria canadensis* Michx. Green everlasting. Star Island, 673. Open woods. Common.

- Anaphalis margaritacea* (L.) B. & H. Everlasting. Star Island 7, 446, 515, 743.  
In clearings and burns.
- Xanthium canadense* Mill. Cocklebur. Cass Lake, 565. Not common.
- Rudbeckia hirta* L. Black-eyed Susan. On the mainland. Cass Lake.
- Helianthus grosseserratus* Martens. Meadow sunflower. Cass Lake, Norway Beach, 294.
- Helianthus strumosus* L. Cass Lake, Norway Beach, 297. Cass Lake, 57, 614, 615.
- Artemisia canadensis* Michx. Wormwood. Star Island, 449. Sandy high banks.
- Anthemis Cotula* L. Mayweed. Star Island, near cottages.
- Achillea Millefolium* L. Yarrow. Star Island, 451. Open places.
- Cirsium muticum* Michx. Swamp thistle. Cass Lake in swamps. Common.
- Cirsium lanceolatum* (L.) Hill. Bull thistle. Star Island, 562. Shore of Cass Lake, not common.
- Cirsium arvense* (L.) Scop. Canada thistle. Star Island, 561, 596. Shore of Cass Lake.
- Taraxacum officinale* Weber. Dandelion. Common mainland, Cass Lake.
- Prenanthes alba* L. Rattlesnake root. In woods, Star Island, 658.
- Hieracium canadense* Michx. Cass Lake, 608. Cass Lake. Star Island, 456. Common.
- Lactuca canadensis* L. Wild lettuce. Cedar Island, 329. Thickets.
- Lactuca pulchella* (Pursh.) D. C. Blue lettuce. Shores Star Island.